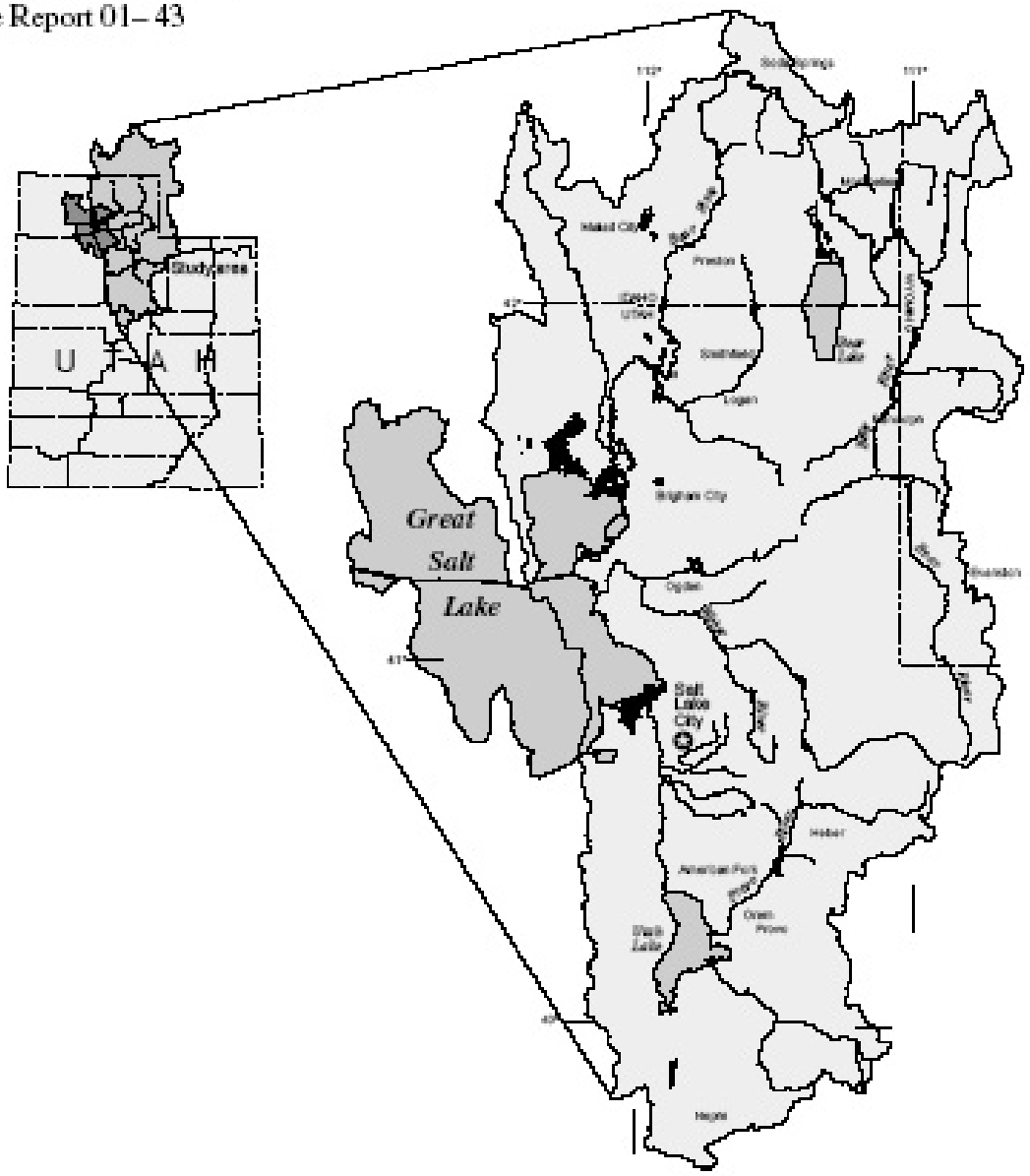
Nutrient, suspended-sediment, and total suspended-solids data for surface water in the Great Salt Lake Basins study unit, Utah, Idaho, and Wyoming, 1980–95

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

U.S. GEOLOGICAL SURVEY
Open-File Report 01– 43



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NUTRIENT, SUSPENDED-SEDIMENT, AND TOTAL SUSPENDED-SOLIDS DATA FOR SURFACE WATER IN THE GREAT SALT LAKE BASINS STUDY UNIT, UTAH, IDAHO, AND WYOMING, 1980-95

By Heidi K. Hadley

NATIONAL WATER-QUALITY ASSESSMENT PROGRAM

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Open-File Report 01-43

Salt Lake City, Utah
2001

FOREWORD

The U.S. Geological Survey (USGS) is committed to serve the Nation with accurate and timely scientific information that helps enhance and protect the overall quality of life, and facilitates effective management of water, biological, energy, and mineral resources. (http://www.usgs.gov/) Information on the quality of the Nation's water resources is of critical interest to the USGS because it is so integrally linked to the long-term availability of water that is clean and safe for drinking and recreation and that is suitable for industry, irrigation, and habitat for fish and wildlife. Escalating population growth and increasing demands for the multiple water uses make water availability, now measured in terms of quantity *and* quality, even more critical to the long-term sustainability of our communities and ecosystems.

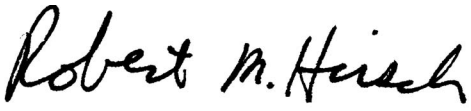
The USGS implemented the National Water-Quality Assessment (NAWQA) Program to support national, regional, and local information needs and decisions related to water-quality management and policy. (http://water.usgs.gov/nawqa). Shaped by and coordinated with ongoing efforts of other Federal, State, and local agencies, the NAWQA Program is designed to answer: What is the condition of our Nation's streams and ground water? How are the conditions changing over time? How do natural features and human activities affect the quality of streams and ground water, and where are those effects most pronounced? By combining information on water chemistry, physical characteristics, stream habitat, and aquatic life, the NAWQA Program aims to provide science-based insights for current and emerging water issues and priorities. NAWQA results can contribute to informed decisions that result in practical and effective water-resource management and strategies that protect and restore water quality.

Since 1991, the NAWQA Program has implemented interdisciplinary assessments in more than 50 of the Nation's most important river basins and aquifers, referred to as Study Units. (http://water.usgs.gov/nawqa/naqwamap.html). Collectively, these Study Unit accounts for more than 60 percent of the overall water use and population served by public water supply, and are representative of the Nation's major hydrologic landscapes, priority ecological resources, and agricultural, urban, and natural sources of contamination.

Each assessment is guided by a nationally consistent study design and methods of sampling and analysis. The assessments thereby build local knowledge about water-quality issues and trends in a particular stream or aquifer while providing an understanding of how and why water quality varies regionally and nationally. The consistent, multi-scale approach helps to determine if certain types of water-quality issues are isolated or pervasive, and allows direct comparisons of how human activities and natural processes affect water quality and ecological health in the Nation's diverse geographic and environmental settings. Comprehensive assessments on pesticides, nutrients, volatile organic compounds, trace metals, and aquatic ecology are developed at the national scale through comparative analysis of the Study-Unit findings. (http://water.usgs.gov/nawqa/natsysn.html).

The USGS places high value on the communication and dissemination of credible, timely, and relevant science so that the most recent and available knowledge about water resources can be applied in management and policy decisions. We hope this NAWQA publication will provide you the needed insights and information to meet your needs, and thereby foster increased awareness and involvement in the protection and restoration of our Nation's waters.

The NAWQA Program recognizes that a national assessment by a single program cannot address all water-resources issues of interest. External coordination at all levels is critical for a fully integrated understanding of watersheds and for cost-effective management, regulation, and conservation of our Nation's water resources. The Program, therefore, depends extensively on the advice, cooperation, and information from other Federal, State, interstate, Tribal, and local agencies, non-governmental organizations, industry, academia, and other stakeholder groups. The assistance and suggestions of all are greatly appreciated.



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[Compact disc in pocket at back of report]

CONVERSION FACTORS

Multiply	By	To obtain
square mile (mi^2)	2.590	square kilometer

Degrees Celsius (×°C) may be converted to degrees Fahrenheit (°F) by using the following equation:

$^{o}F = (1.8 \times {}^{o}C) + 32.$

Nutrient, Suspended-Sediment, and Total Suspended-Solids Data for Surface Water in the Great Salt Lake Basins Study Unit, Utah, Idaho, and Wyoming, 1980-95

By Heidi K. Hadley

ABSTRACT

Selected nitrogen and phosphorus (nutrient), suspended-sediment and total suspended-solids surface-water data were compiled from January 1980 through December 1995 within the Great Salt Lake Basins National Water-Quality Assessment study unit, which extends from southeastern Idaho to west-central Utah and from Great Salt Lake to the Wasatch and western Uinta Mountains. The data were retrieved from the U.S. Geological Survey National Water Information System and the State of Utah, Department of Environmental Quality, Division of Water Quality database. The Division of Water Quality database includes data that are submitted to the U.S. Environmental Protection Agency STOrage and RETrieval system. Water-quality data included in this report were selected for surface-water sites (rivers, streams, and canals) that had three or more nutrient, suspended-sediment, or total suspended-solids analyses. Also, 33 percent or more of the measurements at a site had to include discharge, and, for non-U.S. Geological Survey sites, there had to be 2 or more years of data. Ancillary data for parameters such as water temperature, pH, specific conductance, streamflow (discharge), dissolved oxygen, biochemical oxygen demand, alkalinity, and turbidity also were compiled, as available. The compiled nutrient database contains 13,511 samples from 191 selected sites. The compiled suspended-sediment and total suspended-solids database contains 11,642 samples from 142 selected sites. For the nutrient database, the median (50th percentile) sample period for individual sites is 6 years, and the 75th percentile is 14 years. The median number of samples per site is 52 and the 75th percentile is 110 samples. For the suspended-sediment and total suspended-solids database, the median sample period for individual sites is 9 years, and the 75th percentile is 14 years. The median number of samples per site is 76 and the 75th percentile is 120 samples. The compiled historical data are being used in the basinwide sampling strategy to characterize the broad-scale geographic and seasonal water-quality conditions in relation to major contaminant sources and background conditions. Data for this report are stored on a compact disc.

INTRODUCTION

The Great Salt Lake Basins (GRSL) study unit is 1 of 51 study units located throughout the United States that make up the U.S. Geological Survey (USGS) National Water-Quality Assessment (NAWQA) Program. The GRSL study began in October 1997. A major part of each NAWQA study is retrospective analysis of existing water-quality data. The goals of the retrospective analysis (Gilliom and others, 1995, and Wynn and Spahr, 1997) are to:

1. Provide an historical perspective on water-quality data in the study unit as a base document for future NAWQA work;
2. Assess strengths and weaknesses of the available information;
3. Evaluate initial priorities for water-quality sampling strategy and study design as a guide for additional data collection;
4. Develop an improved conceptual model of spatial and temporal patterns of concentrations and loads within the study unit;
5. Contribute data to the National Synthesis Program of NAWQA.

Water-quality issues that are important in the GRSL study unit include excessive nutrient enrichment in the Bear, Weber, and Jordan Rivers and high and/or increasing sediment loads in the Bear and Weber River Basins. These concerns guided the selection of historical data that will be used in a future interpretative report. The retrospective analysis is used to help design data collection for the GRSL NAWQA study unit. In

the NAWQA Program, emphasis is on occurrence and distribution of major point and nonpoint contaminant sources and natural or background conditions. The occurrence and distribution assessment builds on data from the retrospective analysis and is used to determine a trend-and-change assessment. The trend-and-change assessment is used to more thoroughly investigate how land use (past and present) affects water quality. Through the NAWQA process, important questions of water-quality status, trends, and fate are investigated. Investigation of status questions includes analysis of concentrations and loads of past and present selected parameters such as nutrients and suspended sediment. Investigation of trend questions includes searching for patterns that show how change takes place and defining threshold areas where change from nutrient-limiting to over-enrichment or low to high suspended-sediment loads occurs. Investigation of fate includes more detailed studies in areas identified from the evaluation of the retrospective data and water-quality samples collected during the occurrence and distribution phase to better understand and resolve specific high priority questions regarding the characteristics, causes, and processes of water-quality degradation. Questions of fate become case studies and specifically entail the determination of water-quality impairment sources, transport of pollutants in the water column, and eventual fate and effects of the pollutants.

Purpose and Scope

This report is a compilation of selected nitrogen and phosphorus (nutrient), suspended-sediment, and total suspended-solids data collected from January 1980 through December 1995 within the GRSL study unit. The GRSL study unit extends from southeastern Idaho to west-central Utah and from Great Salt Lake to the Wasatch and western Uinta Mountains. Surface water-quality data included in this report were selected for sites that had three or more nutrient, suspended-sediment, or total suspended-solids analyses. Also, 33 percent or more of the measurements at a site had to include discharge, and, for non-U.S. Geological Survey sites, there had to be 2 or more years of data. Ancillary data for parameters such as water temperature, pH, specific conductance, streamflow (discharge), dissolved oxygen, biochemical oxygen demand (B.O.D. 5), alkalinity, and turbidity also were compiled, if available. The compiled database contains 13,511 samples from 191 selected nutrient sites and 11,642 samples from 142 selected suspended-sediment and total suspended-solids sites. This report is part of the retrospective analysis of the GRSL study unit. The data are stored on a compact disc included in the pocket on the inside back cover.

Description of Study Unit

The GRSL study unit (fig. 1) is located in the northeast corner of Utah, the southeast corner of Idaho, and the southwest corner of Wyoming. The total drainage area is about 14,500 square miles and includes the Bear, Weber, and Utah Lake-Jordan River drainage basins. Each of these basins discharges directly into Great Salt Lake. Water withdrawals in the GRSL study unit were mostly from surface sources (83 percent in 1990 and 85 percent in 1995), and most of the irrigation withdrawals (94 percent in 1990 and 1995) also were surface water. Along the Wasatch Front, where approximately 80 percent of Utah's population resides, surface water provided about 43 percent of public-supply withdrawals in 1990 and about 45 percent in 1995

Land use is the most important factor affecting nutrient and sediment loading within the study unit. High concentrations of nitrogen and phosphorus as a result of discharge from waste-treatment plants, animal grazing, feedlots, and natural factors cause eutrophication, the process by which surface waters increase in biological productivity in response to natural or human-induced nutrient enrichment. Sediments have eroded from stream banks as a result of fluctuating streamflow downstream from hydroelectric plants, animal grazing, modification of land cover, and impacts from road development and urbanization.

NITROGEN AND PHOSPHORUS DATA

Sources

Nutrient data were compiled from two sources: (1) the USGS National Water Information System (NWIS) (Maddy and others, 1990); and (2) the Utah Department of Environmental Quality, Division of Water Quality database, which includes data that are submitted to the U.S. Environmental Protection Agency STOrage and RETrieval system (USEPA STORET). The STORET system is used as a repository for water-quality data by many agencies.

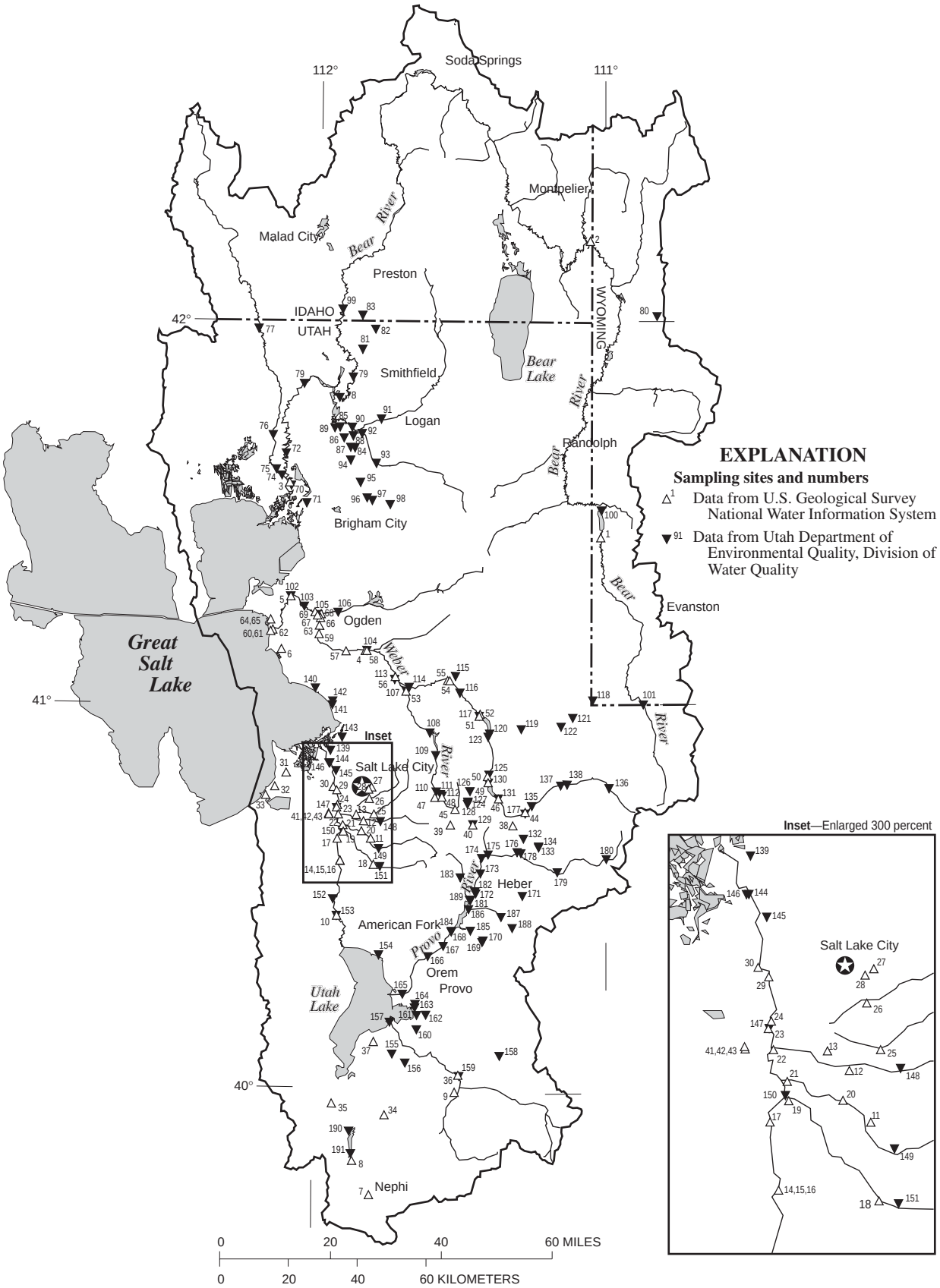

Figure 1. Location of nutrient sampling sites in the Great Salt Lake Basins study unit.

Retrieval

Water-quality data from January 1, 1980, through December 31, 1995, were retrieved for sites within the GRSL study unit. In April 1998 and May 1999, STORET records were retrieved, and in September 1998, NWIS records were retrieved for selected sites. Updates or changes to data in the STORET or NWIS systems after these dates are not included in this report.

Screening

Only records containing data for concentrations of total nitrogen, nitrate, ammonia, total phosphorus, and/or orthophosphate were selected for use. For statistical analysis in future reports, water-quality data in this report were selected for surface-water sites (rivers, streams, and canals) that had three or more nutrient analyses, 33 percent or more discharge measurements, and for non-U.S. Geological Survey sites, 2 or more years of data. Data from point-source sites (sometimes referred to as "outfalls") were excluded. Latitudes and longitudes of each site were plotted to ensure that the sites were located correctly.

Compilation

The file name of the NWIS data set is USGS_NWIS.nut on the compact disc. All of the NWIS parameter codes and their definitions are listed in table 1 in the order that they appear on the compact disc. The file name of the Utah Division of Water Quality's STORET data set is USEPA_STORET.nut. All of the STORET parameter codes and their definitions are listed in table 1 in the order that they appear on the compact disc. Data entered into the NWIS database were collected by the USGS. Data entered into the Division of Water Quality STORET database were collected by several different agencies.

Because many agencies collect nutrient data for different purposes, numerous nutrient parameters are listed in table 1. Mueller and others (1995, p. 7) developed procedures for combining nutrient parameters to make the data more manageable. Nutrient parameters for both NWIS and STORET data were combined to reduce the total number to five for data-analysis purposes. The combined nutrient parameters are:

1. Nitrate as nitrogen (herein referred to as nitrate).
2. Ammonia as nitrogen (herein referred to as ammonia).
3. Total nitrogen as nitrogen (herein referred to as total nitrogen).
4. Total phosphorus as phosphorus (herein referred to as total phosphorus).
5. Orthophosphate as phosphorus (herein referred to as orthophosphate).

The data set was screened to include sites that had a minimum of three analyses for at least one of the five nutrients listed above. The resulting data set contains data analyzed from 13,511 samples collected at 191 sites located within the GRSL study unit (fig. 1). Data from sampling sites labeled 1 through 69 are from the USGS NWIS database, and data from sites 79 through 191 are from the Utah Department of Environmental Quality, Division of Water Quality USEPA STORET database. Sampling site number, site identification number, and site name for each of the 191 sites are listed in table 2.

The total number of samples per site and the number of samples collected for each of the five nutrient parameters are listed, by site, in table 3. The total number of samples for the whole data set and for each of the five nutrient parameters is listed in the last row of table 3. A few of the sites have data for all five nutrients, most do not; therefore, for a specified site, the number of samples in column 2 of table 3 generally is greater than the number of samples collected for any of the five nutrient parameters.

Data collected from January 1980 through December 1995 were compiled for the selected set of 191 sampling sites. The distribution of sampling dates for each USGS NWIS site (1-69) and each USEPA STORET site (70-191) for nutrient data is shown in figure 2.

SUSPENDED-SEDIMENT AND TOTAL SUSPENDED-SOLIDS DATA

Sources

Suspended-sediment and total suspended-solids data were compiled from two sources, respectively: (1) the USGS NWIS (Maddy and others, 1990); and (2) the Utah Department of Environmental Quality, Division of Water Quality database, which includes data that are

Table 1. Parameter codes and definitions for nutrient and ancillary data stored on compact disc

[—, no data; <, less than; >, greater than; E, estimated; U, undetected; N, no value; L, lost sample; X or Q, insufficient water; MMDDYY, month, day, year; HHMM, hour, minutes; mg/L, milligrams per liter; N, nitrogen; NH_4, ammonium ion; NO_2, nitrite; NO_3, nitrate; P, phosphorus; PO_4, phosphate; ^oC, degrees Celsius; ft^3/s, cubic feet per second; µS/cm, microsiemens per centimeter at 25 degrees Celsius; $CaCO_3$, calcium carbonate]

Source	Parameter	Definitin
		File name: USGS_NWIS.nut
NWIS	MAPNO	Map reference number
	LAT	Latitude, degrees north
	LON	Longitude, degrees west
	NAME	Site name
	STAID	Site identification number
	DATABASE	U.S. Geological Survey National Water Information System
	DATE	Sample date (MMDDYY)
	TIME	Sample time (HHMM)
	p00608	Nitrogen, ammonia dissolved (mg/L as N)
	p71846	Nitrogen, ammonia dissolved (mg/L as NH_4)
	p00610	Nitrogen, ammonia total (mg/L as N)
	p71845	Nitrogen, ammonia total (mg/L as NH_4)
	p00613	Nitrogen, nitrite dissolved (mg/L as N)
	p71856	Nitrogen, nitrite dissolved (mg/L as NO_2)
	p00615	Nitrogen, nitrite total (mg/L as N)
	p00631	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)
	p00630	Nitrogen, nitrite plus nitrate, total (mg/L as N)
	p00618	Nitrogen, nitrate dissolved (mg/L as N)
	p71851	Nitrogen, nitrate dissolved (mg/L as NO_3)
	p00620	Nitrogen, nitrate total (mg/L as N)
	p00600	Nitrogen, total (mg/L as N)
	p71887	Nitrogen, total (mg/L as NO_3)
	p00625	Nitrogen, ammonia+organic total (mg/L as N)
	p00671	Phosphorus, ortho, dissolved (mg/L as P)
	p00660	Phosphate, ortho, dissolved (mg/L as PO_4)
	p70507	Phosphorus, ortho, total (mg/L as P)
	p00650	Phosphate, total (mg/L as PO_4)
	p00665	Phosphorus, total (mg/L as P)
	p71886	Phosphorus, total (mg/L as PO_4)
	p00666	Phosphorus, dissolved (mg/L as P)
	p00010	Temperature, water (^oC)
	p00060	Discharge, in cubic feet per second (ft^3/s)
	p00061	Discharge, instantaneous (ft^3/s)
	p00094	Specific conductance, field, in microsiemens per centimeter (uS/cm)
	p00095	Specific conductance, lab (uS/cm)
	p00300	Oxygen, dissolved (mg/L)
	p00301	Oxygen, dissolved (percent saturation)
	p00400	pH, water, field (standard units)
	p00403	pH, water, whole, lab (standard units)
	p00410	Alkalinity, water, whole, total, fixed endpoint titration, field (mg/L as $CaCO_3$)
	p90410	Alkalinity, titration to pH 4.5, laboratory (mg/L as $CaCO_3$)
	p39086	Alkalinity, water, dissolved, total, incremental titration, field (mg/L as $CaCO_3$)

Table 1. Parameter codes and definitions for nutrient and ancillary data stored on compact disc—Continued

Source	Parameter	Definitin
		File name: USEPA_STORET.nut
STORET	MAPNO	Map reference number
	LAT	Latitude, degrees north
	LON	Longitude, degrees west
	NAME	Site name
	STORET No	Site identification number
	DATE	Sample date (MMDDYY)
	TIME	Sample time (HHMM)
	NO_2+NO_3	Nitrogen, nitrite plus nitrate, total (mg/L as N)
	T.K.N.	Total Kjeldahl Nitrogen (mg/L as N)
	AMMONIA	Nitrogen, ammonia, total (mg/L as N)
	NITRATE	Nitrogen, nitrate, total (mg/L as N)
	NITRITE	Nitrogen, nitrite, total (mg/L as N)
	ORTHO PHOS	Phosphorus, orthophosphate, total (mg/L as P)
	T PHOS	Phosphorus, total (mg/L as P)
	D-NO_2+NO3	Nitrogen, nitrite plus nitrate, dissolved (mg/L as N)
	D-OPO_4	Orthophosphate, dissolved (mg/L as P)
	D-NO_3	Nitrogen, nitrate, dissolved (mg/L as N)
	D-NO_2	Nitrogen, nitrite, dissolved (mg/L as N)
	D-T PHOS	Phosphorus, dissolved (mg/L as P)
	F-TEMP	Temperature, water (^oC)
	F-pH	pH, water, field (standard units)
	F-D.O.	Oxygen, dissolved (mg/L)
	F-SP COND	Specific conductance, field, in micromhos per centimeter at 25 degrees Celsius (umhos/cm)
	FLOW	Discharge in cubic feet per second (ft^3/s)

submitted to the USEPA STORET. The STORET system is used as a repository for water-quality data by many agencies.

Retrieval

Water-quality data from January 1, 1980, through December 31, 1995, were retrieved for sites within the GRSL study unit. In April 1998 and May 1999, STORET records were retrieved, and in September 1998, NWIS records were retrieved for selected sites. Updates or changes to data in the STORET or NWIS systems after these dates are not included in this report.

Screening

Only records containing data for concentrations of suspended sediment or total suspended solids were used. Water-quality data in this report were selected for surface-water sites (rivers, streams, and canals) that had three or more suspended-sediment or total suspended-solids analyses. Also, 33 percent or more of the measurements at a site had to include discharge, and, for non-U.S. Geological Survey sites, there had to be 2 or more years of data. Data from point-source sites, sometimes referred to as "outfalls," were excluded. Latitudes and longitudes of each site were plotted to ensure that the sites were located correctly.

Compilation

The file name of the NWIS data set is USGS_NWIS.ss on the compact disc. All of the NWIS parameter codes and their definitions are listed in table 4 in the order that they appear on the compact disc. The file name of the Utah Division of Water Quality STORET data set is USEPA_STORET.tss. All of the STORET parameter codes and their definitions are listed in table 4 in the order that they appear on the compact disc. Data entered into the NWIS database were collected by the USGS. Data entered into the STORET database were collected by several different agencies.

Table 2. Identification number of surface-water sites with nutrient data in the Great Salt Lake Basins study unit, January 1980 to December 1995

[Sampling site number is the field "MAPNO" in table 1 and on compact disc; site identification number is the field "STAID" in table 1 and on compact disc; site name is the field "NAME" in table 1 and on compact disc]

Sampling site number	Site identificatin number	Site name
1	10020100	Bear River above reservoir, near Woodruff, Utah
2	10039500	Bear River at Border, Wyoming
3	10126000	Bear River near Corinne, Utah
4	10136500	Weber River at Gateway, Utah
5	10141000	Weber River near Plain City, Utah
6	10141400	Howard Slough at Hooper, Utah
7	10146000	Salt Creek at Nephi, Utah
8	10146400	Currant Creek near Mona, Utah
9	10148510	Spanish Fork below Halls Falls near Spanish Fork, Utah
10	10167001	Jordan River Station No. 1 at Narrows, Utah
11	10167122	Upper canal at 5800 South (Tolcate Lane) near Murray, Utah
12	10167125	Upper canal at Wild Rose Lane near Salt Lake City, Utah
13	10167149	Jordan and Salt Lake Canal at Zenith Avenue near Salt Lake City, Utah
14	10167230	Jordan River at 90th South near Midvale, Utah
15	10167240	90th South Conduit at Jordan River near Midvale, Utah
16	10167244	Overland Flow Outfall-Best Management Practice basin near Midvale, Utah
17	10167300	Jordan River at 5800 South Murray, Utah
18	10167499	Little Cottonwood Creek (channel) near Salt Lake City, Utah
19	10168000	Little Cottonwood Creek at Jordan River near Salt Lake City, Utah
20	10168840	Holladay drain at 4800 South at Big Cottonwood Creek near Murray, Utah
21	10169500	Big Cottonwood Creek at Jordan River near Salt Lake City, Utah
22	10170250	Mill Creek at Jordan River near Salt Lake City, Utah
23	10170900	2100 South Conduit at Jordan River at Salt Lake City, Utah
24	10171000	Jordan River at 1700 South at Salt Lake City, Utah
25	10171600	Parleys Creek at Suicide Rock, near Salt Lake City, Utah
26	10172000	Emigration Creek near Salt Lake City, Utah
27	10172200	Red Butte Creek at Fort Douglas, near Salt Lake City, Utah
28	10172220	Red Butte Creek below Reservoir near Salt Lake City, Utah
29	10172520	North Temple Conduit at Jordan River at Salt Lake City, Utah
30	10172550	Jordan River at 5th North, at Salt Lake City, Utah
31	10172630	Goggin drain near Magna, Utah
32	10172640	Lee Creek near Magna, Utah
33	10172650	Kennecott drain near Magna, Utah
34	n395521111451000	Summit Creek near Santaquin, Utah
35	n395708111555800	Currant Creek below Goshen Reservoir near Goshen, Utah
36	n400138111301200	Diamond Fork at mouth, near Thistle, Utah
37	n400651111473100	Benjamin Slough near Benjamin, Utah
38	n404051111190901	Beaver Creek near mouth
39	n404055111320001	McLeod Creek below Park City, Utah
40	n404058111272401	Silver Creek at Keetley Junction
41	n404231111570601	Unnamed canal at Decker Lake #2
42	n404233111570601	Unnamed canal at Decker Lake #1
43	n404240111570901	Ridgeland Canal at Decker Lake
44	n404258111163601	Weber River above Weber-Provo diversion
45	n404324111310401	Kimball Creek above unnamed creek from Parleys Park
46	n404503111220801	Weber River above Rockport Reservoir

Table 2. Identification number of surface-water sites with nutrient data in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Site identificatin number	Site name
47	n404516111345801	Toll Creek near Park City, Utah
48	n404519111334701	East Canyon Creek above Toll Creek near Gorgoza
49	n404736111241501	Weber River below Rockport Reservoir
50	n404835111242501	Silver Creek at Wanship
51	n405801111261001	Weber River below Echo Reservoir
52	n405822111260001	Echo Creek at mouth
53	n410154111412201	East Canyon Creek near mouth at Morgan, Utah
54	n410334111321801	Weber River above Lost Creek
55	n410337111321501	Lost Creek at mouth
56	n410410111433701	Weber River above Stoddard Diversion
57	n410808111535301	Weber River at canyon mouth below Weber-Davis Canal
58	n410813111493501	Weber River at Gateway above power plant at bridge
59	n411048111593201	Weber River at Riverdale Road
60	n411109112093601	South Run Canal at Ogden Bay Dike
61	n411112112093601	Weber River South Fork at Ogden Bay Dike
62	n411126112090700	Hooper Slough at U.S. Geological Survey gage
63	n411204111592701	Weber River near Interstate Route 15, 31st Street interchange
64	n411248112093601	Weber River Middle Fork at Ogden Bay Dike
65	n411301112093601	Weber River North Fork at Ogden Bay Dike
66	n411321111591601	Weber River above Wilson Canal and stockyards
67	n411343111595301	Weber River below Union stockyards
68	n411356111590801	Ogden River near mouth
69	n411414112002401	Weber River above Slaterville Diversion
70	490110	Bear River near Corinne at Utah State Route 83 crossing
71	490119	Box Elder Creek above Brigham City Wastewater Treatment Plant
72	490170	Bear River at Interstate Route 15 crossing 2 miles northeast of Honeyville, Utah
73	490198	Bear River below Cutler Reservoir at Utah Power and Light bridge
74	490200	Malad River south of Bear River City
75	490204	Malad River above Bear River City lagoons
76	490272	Malad River above Tremonton Wastewater Treatment Plant
77	490294	Malad River east of Portage
78	490326	Bear River above Cutler Reservoir at bridge 1 mile west of Benson, Utah
79	490356	Bear River at Amalga
80	490379	Cub River west of Franklin, Idaho
81	490425	Cub River at Utah State Route 142 crossing
82	490431	Spring Creek east of Lewiston, Idaho at U.S. Route 91 crossing
83	490437	Worm Creek at Utah-Idaho state line
84	490487	Hyrum Slough at Nibley College Ward crossing
85	490490	Spring Creek at County Road 376 (Mendon) crossing
86	490492	South Fork Spring Creek west of Pelican Pond at road crossing
87	490494	South Fork Spring Creek at U.S. Highway 89 crossing
88	490499	Spring Creek 1 1/3 miles north of College Ward at creek crossing
89	490500	Little Bear River at County Road 376 crossing (Mendon)
90	490504	Logan River above confluence with Little Bear River at County Road 376 crossing
91	490520	Logan River at mouth of canyon
92	490540	Blacksmith Fork River above confluence with Logan River at U.S. Highway 89 crossing
93	490544	Blacksmith Fork River at mouth of canyon at Utah Highway 101 crossing
94	490565	Little Bear River 1 mile below Hyrum Reservoir at County Road crossing
95	490567	Little Bear River below White Trout Farm at County Road crossing

Table 2. Identification number of surface-water sites with nutrient data in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Site identificatin number	Site name
96	490570	Little Bear River west of Avon at Creek crossing
97	490575	East Fork Little Bear River above confluence with South Fork Little Bear River
98	490578	East Fork Little Bear River below Porcupine Reservoir at creek crossing
99	490610	Bear River west of Fairview, Idaho
100	490890	Bear River below Woodruff Reservoir
101	490950	Bear River at Utah-Wyoming state line
102	492005	Weber River south of Plain City, Utah
103	492012	Weber River above Central Weber Wastewater Treatment Plant
104	492100	Weber River at Gateway to power house
105	492299	Weber River above confluence with Ogden River
106	492320	Ogden River at mouth of Canyon at Valley Drive crossing
107	492496	East Canyon Creek above confluence with Weber River
108	492515	East Canyon Creek below East Canyon Reservoir
109	492520	East Canyon Creek above reservoir at Utah State Route 65 crossing
110	492523	East Canyon Creek below Jeremy Ranch golf course
111	492524	East Canyon Creek below East Canyon Wastewater Treatment Plant
112	492526	East Canyon Creek above East Canyon Wastewater Treatment Plant
113	492552	Weber River at Milton/Stoddard Road crossing
114	492554	Weber River above Morgan lagoons
115	492576	Lost Creek above confluence with Ideal Cement
116	492600	Weber River above Henefer lagoons
117	492610	Weber River below Echo Reservoir
118	492628	Chalk Creek at Utah-Wyoming state line
119	492629	Chalk Creek above confluence with South Fork
120	492635	Chalk Creek at U.S. Route 189 crossing
121	492638	Chalk Creek at culvert 0.8 mile above Pine Cliff campground
122	492639	Chalk Creek 4 miles east of Upton
123	492640	Weber River above Echo Reservoir
124	492674	Silver Creek at farm crossing in Atkinson
125	492675	Silver Creek at Wanship above confluence with Weber River
126	492676	Silver Creek 2 miles north of Atkinson
127	492677	Silver Creek at Interstate 80 crossing at Atkinson east of Silver Creek Junction
128	492680	Silver Creek above Atkinson
129	492685	Silver Creek at U.S. Route 40 crossing east of Park City, Utah
130	492701	Weber River below Wanship Reservoir
131	492725	Weber River above Wanship Reservoir
132	492853	Beaver Creek above Weber-Provo Canal
133	492899	Beaver Creek at bridge to Willow Springs fish hatchery
134	492901	Beaver Creek above Kamas fish hatchery
135	492920	Weber River above Weber/Provo diversion
136	492940	Weber River above Holiday Park
137	492949	Smith Morehouse Creek above confluence with Weber River
138	492959	Weber River above confluence with Smith Morehouse Creek
139	499011	Kays Creek at lower bridge crossing
140	499025	Baer Creek below central Davis Wastewater Treatment Plant
141	499029	Baer Creek above central Davis Wastewater Treatment Plant at Shepard Lane
142	499064	Stone Creek at entrance to Farmington Bay
143	499088	Jordan River at State Canal road crossing
144	499105	Sewage canal at Cudahy Lane crossing

Table 2. Identification number of surface-water sites with nutrient data in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Site identificatin number	Site name
145	499123	Sewage canal above Chevron Oil
146	499182	Jordan River at Cudahy Lane above South Davis South Wastewater Treatment Plant
147	499232	Jordan River 1100 West 2100 South
148	499264	Mill Creek at U.S. Forest Service boundary
149	499310	Big Cottonwood Creek at U.S. Forest Service boundary
150	499358	Little Cottonwood Creek 4900 South 600 West
151	499366	Little Cottonwood Creek above Murray City water intake
152	499460	Jordan River at Bluffdale Road crossing
153	499472	Jordan River at Narrows pump station
154	499479	Jordan River at Utah Lake outlet Utah State Route 121 crossing
155	499542	Beer Creek above Payson Wastewater Treatment Plant at Utah State Route 115 crossing
156	499545	Beer Creek above Salem Wastewater Treatment Plant
157	499558	Spanish Fork River above Utah Lake (Lakeshore)
158	499564	Diamond Fork Creek above Spanish Fork River at Utah State Route 6
159	499579	Spanish Fork River above confluence with Diamond Fork Creek
160	499603	Dry Creek above Spanish Fork Wastewater Treatment Plant
161	499610	Hobble Creek at Interstate 15 bridge 3 miles south of Provo
162	499648	Ironton Canal above Reilly Tar and Chemical and below fish hatchery
163	499654	Millrace Creek at Interstate 15 crossing 2 miles south of Provo Courthouse
164	499657	Millrace Creek above Provo Wastewater Treatment Plant
165	499669	Provo River at Utah State Route 114 crossing
166	499680	Provo River at Rotary Park
167	499685	North Fork Provo River above confluence with Provo River at Wildwood
168	499687	Little Deer Creek above confluence with Provo River
169	499691	Little Hobble Creek at Round Valley road crossing
170	499692	Main Creek at Round Valley road crossing
171	499707	Lake Creek above confluence with tributary from Timber Lakes headquarters
172	499725	Spring Creek above confluence with Provo River near Heber
173	499730	Provo River at Midway cutoff road crossing north of Heber
174	499733	Provo River at Jordanelle on U.S. Highway 40 crossing
175	499808	Provo River above Jordanelle Reservoir at road crossing
176	499814	Weber-Provo Canal diversion at U.S. Highway189 alternate crossing
177	499823	Weber-Provo Canal inlet below diversion from Weber River
178	499827	Provo River at Lemon Grove above Weber River diversion
179	499840	Provo River above Woodland at USGS gage 10154200
180	499900	Provo River at Cobble Rest campground
181	591016	Snake Creek above confluence with Provo River at U.S. Bureau of Reclamation gage
182	591025	Provo River Heber-Midway road crossing below Berken Pond
183	591045	Snake Creek above Wasatch Mountain State Park golf course near ranger station house
184	591321	Provo River below Deer Creek Reservoir
185	591346	Main Creek above Deer Creek Reservoir at U.S. Highway 189 crossing
186	591352	Daniels Creek above Deer Creek Reservoir
187	591354	Daniels Creek at first diversion
188	591355	Daniels Creek at Whiskey Springs
189	591363	Provo River above confluence with Snake Creek at McKeller Bridge
190	591806	Currant Creek below Mona Reservoir
191	591810	Currant Creek above Mona Reservoir

Table 3. Number of nutrient samples collected per site in the Great Salt Lake Basins study unit, January 1980 to December 1995

[Sampling site number is "MAPNO" in table 1 and on compact disc]

Sampling site number	Number of samples					
	Total	Nitrate	Ammonia	Total nitrogen	Total phosphorus	Ortho-phosphate
1	64	60	54	45	64	0
2	110	108	80	45	110	66
3	76	76	76	76	76	54
4	42	42	0	0	0	40
5	75	75	71	70	71	53
6	50	50	0	1	0	50
7	8	8	7	0	0	7
8	7	7	7	0	0	7
9	7	7	7	0	0	7
10	28	28	28	18	28	0
11	6	6	6	5	6	0
12	17	16	16	15	17	0
13	13	13	13	11	13	0
14	35	35	35	29	34	0
15	25	25	25	22	22	3
16	9	9	9	5	5	4
17	54	34	34	49	53	0
18	13	13	13	12	12	0
19	20	20	20	19	20	0
20	32	32	32	32	32	0
21	16	16	16	15	15	0
22	17	17	17	17	17	0
23	18	18	18	17	18	0
24	125	125	125	119	124	72
25	14	14	14	12	13	0
26	13	13	13	12	12	1
27	111	110	99	17	109	87
28	10	10	10	6	9	0
29	18	18	16	15	15	0
30	37	37	37	31	36	0
31	47	45	0	0	0	46
32	29	27	2	0	0	27
33	46	45	1	0	0	45
34	6	6	6	0	0	6
35	7	7	7	0	0	7
36	7	7	7	0	0	7
37	6	6	6	0	0	6
38	4	4	0	0	0	4
39	4	4	0	0	0	4
40	4	4	0	0	0	4

Table 3. Number of nutrient samples collected per site in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples					
	Total	Nitrate	Ammonia	Total nitrogen	Total phosphorus	Ortho-phosphate
41	5	5	5	5	5	5
42	10	10	10	10	10	10
43	10	10	10	10	10	10
44	4	4	0	0	0	4
45	4	4	0	0	0	4
46	4	4	0	0	0	4
47	3	3	0	0	0	0
48	4	4	0	0	0	4
49	4	4	0	0	0	4
50	4	4	0	0	0	4
51	4	4	0	0	0	4
52	4	4	0	0	0	4
53	4	4	0	0	0	4
54	3	3	0	0	0	3
55	4	4	0	0	0	4
56	4	4	0	0	0	4
57	4	4	0	0	0	4
58	3	3	0	0	0	3
59	4	4	0	0	0	4
60	4	4	0	0	0	4
61	3	3	0	0	0	3
62	4	4	0	0	0	4
63	4	4	0	0	0	4
64	4	4	0	0	0	4
65	4	4	0	0	0	4
66	3	3	0	0	0	3
67	4	4	0	0	0	4
68	3	3	0	0	0	3
69	3	3	0	0	0	3
70	143	142	143	42	141	80
71	113	86	113	104	103	55
72	65	64	65	14	65	14
73	119	102	119	119	118	63
74	55	22	55	23	46	17
75	42	7	47	8	30	2
76	107	83	106	99	98	54
77	57	54	57	57	57	37
78	105	104	105	20	105	34
79	42	21	21	0	22	21
80	107	86	84	28	84	43

Table 3. Number of nutrient samples collected per site in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples					
	Total	Nitrate	Ammonia	Total nitrogen	Total phosphorus	Ortho-phosphate
81	164	136	137	7	136	100
82	49	32	32	0	32	15
83	60	41	41	0	41	21
84	51	51	51	1	51	0
85	54	54	53	1	54	0
86	50	50	50	0	50	0
87	52	52	52	48	52	0
88	52	52	52	1	52	0
89	153	152	153	31	153	62
90	118	99	118	118	118	62
91	129	112	128	108	128	62
92	56	19	39	37	38	28
93	113	96	113	113	112	62
94	64	54	64	64	64	21
95	50	26	50	32	50	21
96	150	148	149	22	149	77
97	54	46	46	2	46	26
98	48	48	47	1	48	23
99	161	160	161	35	159	85
100	80	80	80	80	80	64
101	104	93	104	104	102	76
102	124	120	93	44	89	83
103	84	68	84	70	78	53
104	129	126	129	37	126	61
105	19	19	19	1	19	0
106	81	79	48	17	47	33
107	138	133	108	16	108	68
108	47	47	47	3	47	2
109	192	189	191	95	189	76
110	218	215	211	76	205	79
111	213	190	206	161	198	62
112	234	233	230	92	224	78
113	25	19	19	1	19	0
114	103	95	103	12	97	54
115	109	81	102	83	101	56
116	86	73	86	13	74	49
117	36	34	34	16	34	6
118	45	33	36	35	36	4
119	51	43	50	50	50	4
120	181	176	152	35	152	83

Table 3. Number of nutrient samples collected per site in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples					
	Total	Nitrate	Ammonia	Total nitrogen	Total phosphorus	Ortho-phosphate
121	46	39	42	41	42	3
122	45	38	45	45	45	3
123	155	152	125	27	125	90
124	25	10	25	2	0	0
125	163	159	133	31	133	93
126	94	82	88	88	88	58
127	125	94	121	92	90	62
128	93	67	80	78	79	56
129	48	40	45	2	31	2
130	26	26	26	7	26	1
131	201	196	167	51	165	120
132	92	62	90	55	91	64
133	52	52	52	52	52	52
134	120	94	120	70	120	68
135	19	19	19	0	19	0
136	8	8	8	0	8	0
137	18	18	18	0	18	0
138	18	18	18	0	18	0
139	60	60	60	41	60	3
140	42	42	42	42	42	4
141	86	65	86	85	86	52
142	57	57	57	41	57	18
143	132	130	132	117	130	42
144	48	33	48	9	35	14
145	13	0	13	0	0	0
146	168	166	168	81	168	59
147	92	53	90	0	39	13
148	147	144	143	120	137	95
149	154	151	150	121	142	102
150	23	23	23	0	23	0
151	153	150	149	120	141	101
152	183	138	177	35	136	63
153	82	80	82	8	75	22
154	146	140	146	37	142	71
155	92	59	91	77	79	55
156	64	8	64	8	62	3
157	126	105	120	116	130	67
158	131	99	130	98	130	59
159	130	108	129	97	129	57
160	108	75	108	95	95	54

Table 3. Number of nutrient samples collected per site in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples					
	Total	Nitrate	Ammonia	Total nitrogen	Total phosphorus	Ortho-phosphate
161	115	81	115	93	115	53
162	95	74	95	92	94	53
163	101	65	94	82	82	48
164	117	86	110	98	98	56
165	159	147	159	42	158	66
166	92	72	92	90	92	59
167	91	66	91	20	91	32
168	104	79	104	33	104	45
169	37	36	36	36	37	37
170	43	43	42	31	42	31
171	31	31	31	14	31	31
172	100	82	99	52	100	64
173	80	49	65	30	63	57
174	243	213	225	150	222	170
175	54	54	41	38	40	45
176	175	145	175	116	175	123
177	43	26	43	18	43	19
178	134	110	134	110	133	117
179	186	156	186	116	185	88
180	40	35	23	1	37	28
181	279	235	236	169	269	186
182	87	87	69	58	69	66
183	161	134	160	110	161	121
184	250	216	184	117	214	169
185	208	175	161	96	190	145
186	202	168	145	89	176	139
187	47	46	46	47	47	42
188	39	39	39	21	39	21
189	262	231	183	113	210	183
190	56	56	56	55	56	45
191	61	60	63	58	60	56
Total	13,511	11,821	12,267	7,100	12,054	6,823

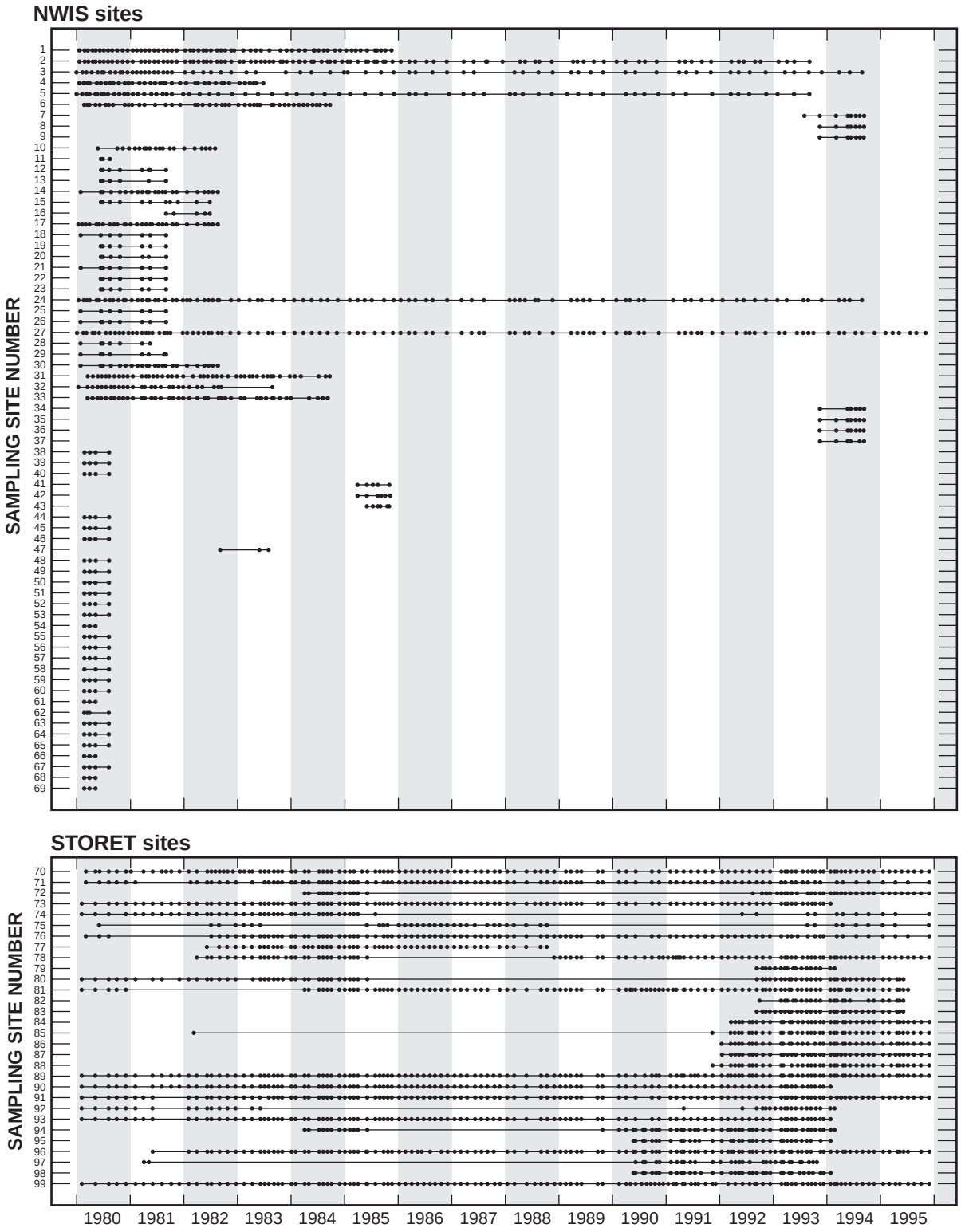

Figure 2. Distribution of sampling dates for nutrient data collection, Great Salt Lake Basins study unit. (See fig. 1 and table 2 for information on sampling sites.)

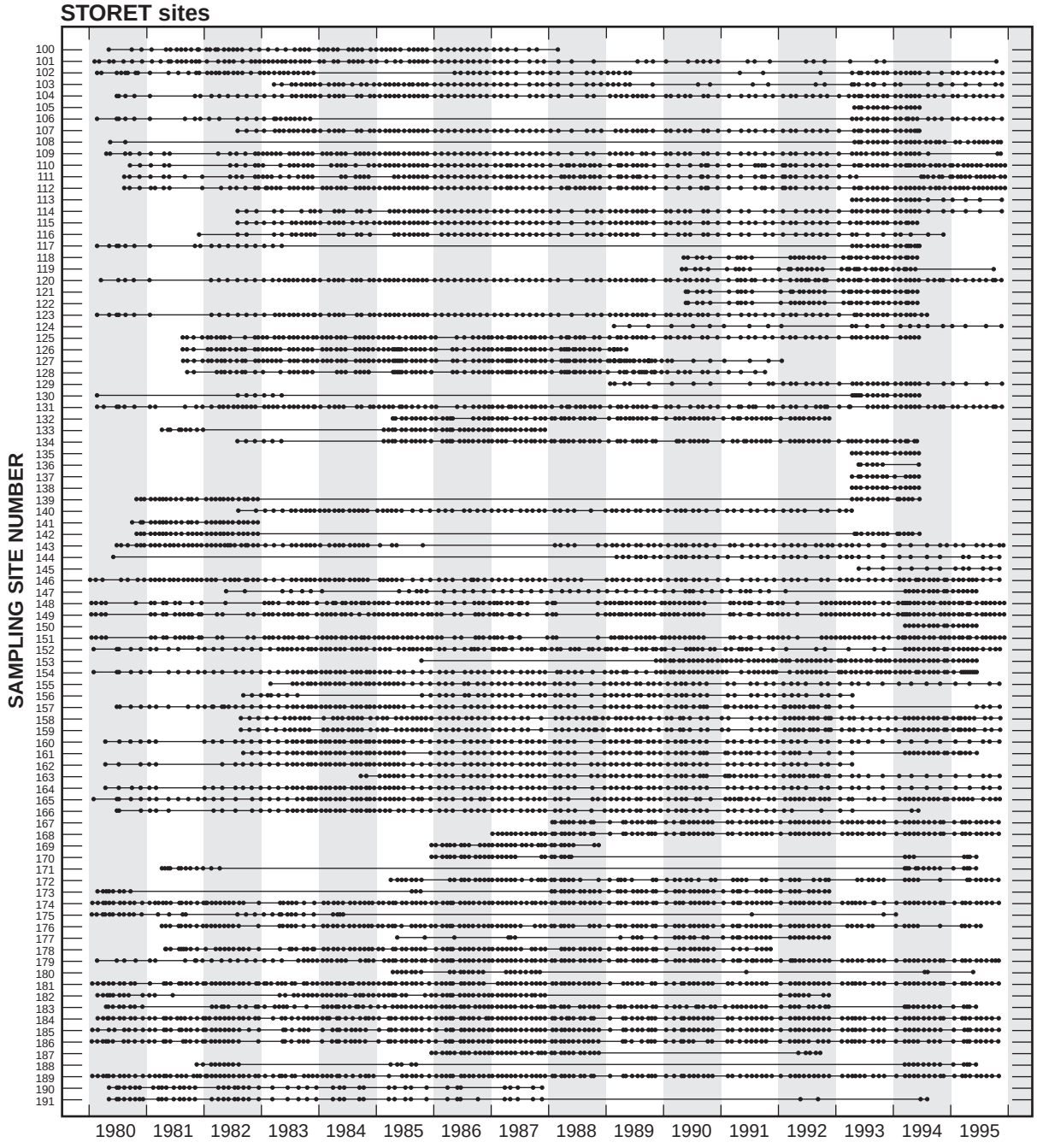

Figure 2. Distribution of sampling dates for nutrient data collection, Great Salt Lake Basins study unit—Continued.

Table 4. Parameter codes and definitions for suspended-sediment and total suspended-solids data stored on the compact disc

[—, no data; <, less than; >, greater than; E, estimated; U, undetected; N, no value; L, lost sample; X or Q, insufficient water; MMDDYY, month, day, year; HHMM, hour, minute; °C, degrees Celsius; µS/cm, microsiemens per centimeter at 25 degrees Celsius; ft^3/s, cubic feet per second; µmhos/cm, micromhos per centimeter (µS=µmhos); mg/L, milligrams per liter; T/day, tons per day; NTU, nephelometric turbidity units]

Source	Parameter	Definition
		File name: USGS_NWIS.ss
NWIS	MAPNO	Map reference number
	LAT	Latitude, degrees north
	LON	Longitude, degrees west
	NAME	Site name
	STAID	Site identification number
	DATABASE	U.S. Geological Survey National Water Information System
	DATE	Sample date (MMDDYY)
	TIME	Sample time (HHMM)
	p00010	Temperature, water (°C)
	p00400	pH, water, whole, field (standard units)
	p00095	Specific conductance, field (µS/cm)
	p00061	Discharge, instantaneous (ft^3/s)
	p00300	Oxygen, dissolved (mg/L)
	p00301	Oxygen, dissolved (percent saturation)
	p80154	Suspended sediment (mg/L)
	p80155	Suspended-sediment discharge (T/day)
	p00076	Turbidity in nephelometric turbidity units (NTU)
		File name: USEPA_STORET.tss
STORET	MAPNO	Map reference number
	LAT	Latitude, degrees north
	LON	Longitude, degrees west
	NAME	Site name
	STORET No	Site identification number
	DATE	Sample date (MMDDYY)
	TIME	Sample time (HHMM)
	F-TEMP	Temperature, water (°C)
	F-pH	pH, water, field (standard units)
	F-D.O.	Oxygen, dissolved (mg/L)
	F-SP COND	Specific conductance, field (µmhos/cm)
	FLOW	Discharge (ft^3/s)
	B.O.D. 5	Biochemical oxygen demand, incubation of 5 days at 20 degrees Celsius (weight of oxygen in mg/L of initial sample)
	T.SUS.SOL	Total suspended solids (mg/L)
	TURBIDITY	Turbidity (NTU)

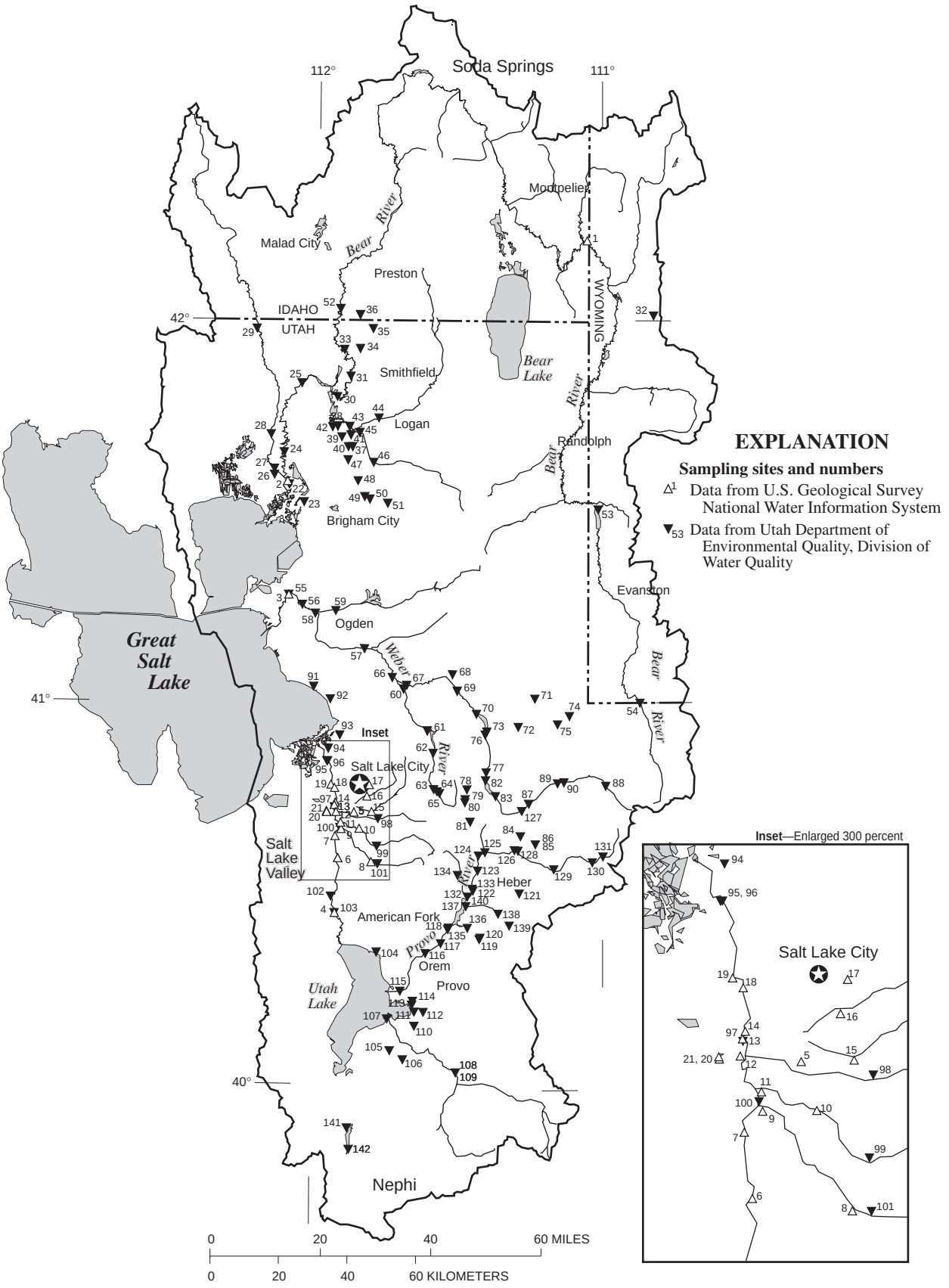

Figure 3. Location of sampling sites for suspended sediment and total suspended solids in the Great Salt Lake Basins study unit.

The data set was screened to include sites that had a minimum of three analyses for either suspended sediment or total suspended solids. The resulting data set contains data analyzed from 11,642 samples collected at 142 selected sites located within the GRSL study unit. The locations of these 142 sites are shown in figure 3. Data from the sampling sites labeled 1 through 21 are from the USGS NWIS database, and data from sites 22 through 142 are from the Utah Division of Water Quality USEPA STORET database. Sampling site number, site identification number, and site name for each of the 142 sites are listed in table 5.

The total number of samples per site and the number of samples collected for each parameter are listed by sampling site number in table 6. The total number of samples for the whole data set and for each parameter is listed in the last row of table 6.

Data for surface-water samples collected from January 1980 through December 1995 were selected from NWIS and STORET. The distribution of sampling dates for each USGS NWIS site (1-21) and each USEPA STORET site (22-142) for suspended-sediment and total suspended-solids data is shown in figure 4.

SUMMARY

The historical data compiled for the Great Salt Lake Basins study unit January 1, 1980, through December 31, 1995, are being used to characterize the broad-scale geographic and seasonal distributions of water-quality conditions in relation to major contaminant sources and background conditions. The data will be used for analyses of the spatial distribution, relation to land use, and temporal trends of nutrient, suspended-sediment, and total-suspended solids concentrations in surface waters of the study unit.

It is important to determine the similarity of sampling frequency and period of record before attempting to compare data values among sites. Sites that have been sampled during the same time intervals may be useful for evaluating water-quality changes within the reach represented by the sites. Trends can best be seen when sites have been sampled for longer periods during similar times of year.

For the nutrient database, the median sample period of record for individual sites is 6 years, and the 75th percentile is 14 years. The median number of samples per site is 52 and the 75th percentile is 110 samples.

For the suspended-sediment and total suspended-solids database, the median sample period of record for individual sites is 9 years, and the 75th percentile is 14 years. The median number of samples per site is 76 and the 75th percentile is 120 samples.

DESCRIPTION OF COMPACT DISC

The compact disc in the pocket inside the back cover contains four compiled data sets:

USGS_NWIS.nut
USEPA_STORET.nut
USGS_NWIS.ss
USEPA_STORET.tss

The README file explains the different formats for these data sets.

All four data sets are sorted sequentially by sampling site number (MAPNO), date, and time.

For USGS_NWIS.nut, 42 parameters begin with MAPNO and end with p39086 (alkalinity). For USEPA_STORET.nut, 24 parameters, begin with MAPNO and end with FLOW. (See table 1 for parameter codes and their definitions for data stored in USGS_NWIS.nut and USEPA_STORET.nut.)

For USGS_NWIS.ss, 17 parameters begin with MAPNO and end with p00076 (turbidity). For USEPA_STORET.tss, 15 parameters begin with MAPNO and end with TURBIDITY. (See table 4 for parameter codes and their definitions for data stored in USGS_NWIS.ss and USEPA_STORET.tss.)

For NWIS data, it is possible to have a symbol that precedes a water-quality value. Constituent concentrations reported as above or below a laboratory reporting limit or undetected are considered censored values (numbers) and have a “>” or “<” in front of the value, or a “U” (undetected) in place of a value. A “>” indicates that the actual value is known to be greater than the value in the parameter field for that constituent. A“<” preceding a number indicates that the actual value is known to be less than the number in the parameter field for that constituent. A “U” indicates the water was specifically analyzed for the particular constituent, but the constituent was undetected (Maddy and others, 1990, p. 2-14). An “E” indicates that the value has been estimated. A “--” indicates there is no value because no analysis was done for that constituent.

Table 5. Identification number of surface-water sites with suspended-sediment and total suspended-solids data in the Great Salt Lake Basins study unit, January 1980 to December 1995

[Sampling site number is "MAPNO" in table 1 and on compact disc; site identification number is "STAID" in table 1 and on compact disc; site name is "NAME" in table 1 and on compact disc]

Sampling site number	Site identification number	Site name
1	10039500	Bear River at Border, Wyoming
2	10126000	Bear River near Corinne, Utah
3	10141000	Weber River near Plain City, Utah
4	10167001	Jordan River Station No. 1 at Narrows, Utah
5	10167149	Jordan and Salt Lake Canal at Zenith Avenue near Salt Lake City, Utah
6	10167230	Jordan River at 90th South near Midvale, Utah
7	10167300	Jordan River at 5800 South Murray, Utah
8	10167499	Little Cottonwood Creek (channel) near Salt Lake City, Utah
9	10168000	Little Cottonwood Creek at Jordan River near Salt Lake City, Utah
10	10168840	Holladay drain at 4800 South and Big Cottonwood Creek near Murray, Utah
11	10169500	Big Cottonwood Creek at Jordan River near Salt Lake City, Utah
12	10170250	Mill Creek at Jordan River near Salt Lake City, Utah
13	10170900	2100 South conduit at Jordan River at Salt Lake City, Utah
14	10171000	Jordan River at 1700 South at Salt Lake City, Utah
15	10171600	Parleys Creek at Suicide Rock near Salt Lake City, Utah
16	10172000	Emigration Creek near Salt Lake City, Utah
17	10172200	Red Butte Creek at Fort Douglas, near Salt Lake City, Utah
18	10172520	North Temple conduit at Jordan River at Salt Lake City, Utah
19	10172550	Jordan River at 5th North at Salt Lake City, Utah
20	n404231111570601	Unnamed canal at Decker Lake No. 2
21	n404233111570601	Unnamed canal at Decker Lake No. 1
22	490110	Bear River near Corinne at Utah State Route 83 crossing
23	490119	Box Elder Creek above Brigham City Wastewater Treatment Plant
24	490170	Bear River at Interstate Route 15 crossing 2 miles northeast of Honeyville
25	490198	Bear River below Cutler Reservoir at Upper L Bridge
26	490200	Malad River south of Bear River City
27	490204	Malad River above Bear River City lagoons
28	490272	Malad River above Tremonton Wastewater Treatment Plant
29	490294	Malad River east of Portage
30	490326	Bear River above Cutler Reservoir at bridge 1 mile west of Benson, Utah
31	490356	Bear River at Amalga
32	490379	Cub River West of Franklin, Idaho
33	490382	Bear River West of Richmond at Utah State Route 142 crossing
34	490425	Cub River at Utah State Route 142 crossing
35	490431	Spring Creek east of Lewiston, Idaho at U.S. Route 91 crossing
36	490437	Worm Creek at Utah-Idaho state line
37	490487	Hyrum Slough at Nibley College Ward crossing
38	490490	Spring Creek at County Road 376 (Mendon) crossing
39	490492	South Fork Spring Creek west of Pelican Pond at road crossing
40	490494	South Fork Spring Creek at U.S. Highway 89 crossing
41	490499	Spring Creek 1 1/3 miles north of College Ward at county road crossing
42	490500	Little Bear River at County Road 376 crossing (Mendon)
43	490504‘	Logan River above confluence with Little Bear River at County Road 376 crossing
44	490520	Logan River at mouth of canyon
45	490540	Blacksmith Fork River above confluence with Logan River at U.S. Highway 89 crossing
46	490544	Blacksmith Fork River at mouth of canyon at Utah State Route 101 crossing
47	490565	Little Bear River 1 mile below Hyrum Reservoir

Table 5. Identification number of surface-water sites with suspended-sediment and total suspended-solids data in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Site identification number	Site name
48	490567	Little Bear River below White Trout Farm
49	490570	Little Bear River west of Avon at County Road crossing
50	490575	East Fork Little Bear River above confluence with South Fork Little Bear River
51	490578	East Fork Little Bear River below Porcupine Reservoir at County Road crossing
52	490610	Bear River west of Fairview, Idaho
53	490890	Bear River below Woodruff Reservoir
54	490950	Bear River at Utah-Wyoming State line
55	492005	Weber River south of Plain City, Utah
56	492012	Weber River above Central Weber Wastewater Treatment Plant
57	492100	Weber River at Gateway to power house
58	492299	Weber River above confluence with Ogden River
59	492320	Ogden River at mouth of canyon at Valley Drive crossing
60	492496	East Canyon Creek above confluence with Weber River
61	492515	East Canyon Creek below East Canyon Reservoir
62	492520	East Canyon Creek above Reservoir at Utah State Route 65 crossing
63	492523	East Canyon Creek below Jeremy Ranch golf course
64	492524	East Canyon Creek below East Canyon Wastewater Treatment Plant
65	492526	East Canyon Creek above East Canyon Wastewater Treatment Plant
66	492552	Weber River at Milton/Stoddard road crossing
67	492554	Weber River above Morgan lagoons
68	492576	Lost Creek above confluence with Ideal Cement
69	492600	Weber River above Henefer Lagoons
70	492610	Weber River below Echo Reservoir
71	492628	Chalk Creek at Utah-Wyoming state line
72	492629	Chalk Creek above confluence with South Fork
73	492635	Chalk Creek at U.S. Route 189 crossing
74	492638	Chalk Creek at culvert 0.8 mile above Pine Cliff campground
75	492639	Chalk Creek 4 miles east of Upton
76	492640	Weber River above Echo Reservoir
77	492675	Silver Creek at Wanship above confluence with Weber River
78	492676	Silver Creek 2 miles north of Atkinson
79	492677	Silver Creek at Interstate 80 crossing at Atkinson east of Silver Creek Junction
80	492680	Silver Creek at Interstate 80 above Atkinson
81	492685	Silver Creek at U.S. Route 40 crossing east of Park City, Utah
82	492701	Weber River below Wanship Reservoir
83	492725	Weber River above Wanship Reservoir
84	492853	Beaver Creek above Weber-Provo Canal
85	492899	Beaver Creek at bridge to Willow Springs fish hatchery
86	492901	Beaver Creek above Kamas fish hatchery
87	492920	Weber River above Weber/Provo diversion
88	492940	Weber River above Holiday Park
89	492949	Smith Morehouse Creek above confluence with Weber River
90	492959	Weber River above confluence with Smith Morehouse Creek
91	499011	Kays Creek at lower bridge crossing
92	499029	Baer Creek above Central Davis Wastewater Treatment Plant at Shepard Lane
93	499064	Stone Creek at entrance to Farmington Bay
94	499088	Jordan River at State Canal road crossing
95	499105	Sewage Canal at Cudahy Lane crossing
96	499182	Jordan River at Cudahy Lane above South Davis South Wastewater Treatment Plant

Table 5. Identification number of surface-water sites with suspended-sediment and total suspended-solids data in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Site identification number	Site name
97	499232	Jordan River 1100 West 2100 South
98	499264	Mill Creek at U.S. Forest Service boundary
99	499310	Big Cottonwood Creek at U.S. Forest Service boundary
100	499358	Little Cottonwood Creek 4900 South 600 West
101	499366	Little Cottonwood Creek above Murray City water intake
102	499460	Jordan River at Bluffdale road crossing
103	499472	Jordan River at Narrows pump station
104	499479	Jordan River at Utah Lake outlet Utah State Route 121 crossing
105	499542	Beer Creek above Payson Wastewater Treatment Plant at Utah State Route 115 crossing
106	499545	Beer Creek above Salem Wastewater Treatment Plant
107	499558	Spanish Fork River above Utah Lake
108	499564	Diamond Fork Creek above Spanish Fork River at U.S. Route 6
109	499579	Spanish Fork River above confluence with Diamond Fork Creek
110	499603	Dry Creek above Spanish Fork Wastewater Treatment Plant
111	499610	Hobble Creek at Interstate Route 15
112	499648	Ironton Canal above Reilly Tar and Chemical and below fish hatchery
113	499654	Millrace Creek at Interstate Route 15 crossing
114	499657	Millrace Creek above Provo Wastewater Treatment Plant
115	499669	Provo River at Utah State Route 114 crossing
116	499680	Provo River at Rotary Park
117	499685	North Fork Provo River above confluence with Provo River at Wildwood
118	499687	Little Deer Creek above confluence with Provo River
119	499691	Little Hobble Creek at Round Valley road crossing
120	499692	Main Creek at Round Valley road crossing
121	499707	Lake Creek above confluence with tributary from Timber Lakes headquarters
122	499725	Spring Creek above confluence with Provo River near Heber
123	499730	Provo River at Midway cutoff road crossing north of Heber
124	499733	Provo River at Jordanelle on U.S. Route 40 crossing
125	499808	Provo River above Jordanelle Reservoir at road crossing
126	499814	Weber-Provo Canal diversion at U.S. Route 189 Alternate crossing
127	499823	Weber-Provo Canal inlet below diversion from Weber River
128	499827	Provo River at Lemon Grove above Weber River diversion
129	499840	Provo River above Woodland at USGS gage no. 10154200
130	499890	Provo River at Soapstone campground
131	499900	Provo River at Cobble Rest campground
132	591016	Snake Creek above confluence with Provo River at U.S. Bureau of Reclamation gage
133	591025	Provo River Heber-Midway road crossing below Berken Pond
134	591045	Snake Creek above Wasatch Mountain State Park golf course
135	591321	Provo River below Deer Creek Reservoir
136	591346	Main Creek above Deer Creek Reservoir at U.S. Route 189 crossing
137	591352	Daniels Creek above Deer Creek Reservoir
138	591354	Daniels Creek at first diversion
139	591355	Daniels Creek at Whiskey Springs
140	591363	Provo River above confluence with Snake Creek at McKellan bridge
141	591806	Currant Creek below Mona Reservoir
142	591810	Currant Creek above Mona Reservoir

Table 6. Number of samples collected per site for suspended sediment, total suspended solids, and other selected parameters in the Great Salt Lake Basins study unit, January 1980 to December 1995

[Sampling site number is "MAPNO" in table 4 and on compact disc]

Sampling site number	Number of samples				
	Total	Discharge measurement	Suspended sediment	Total suspended solids	Turbidity
1	89	89	89	0	66
2	87	87	87	0	52
3	69	68	69	0	51
4	19	17	19	0	19
5	5	3	5	0	1
6	22	19	22	0	21
7	26	24	26	0	21
8	4	2	4	0	1
9	5	3	5	0	1
10	9	5	9	0	4
11	4	3	4	0	0
12	8	6	8	0	1
13	4	2	4	0	1
14	125	124	125	0	94
15	3	2	3	0	0
16	5	4	5	0	1
17	113	108	113	0	61
18	7	5	7	0	2
19	26	24	26	0	19
20	4	2	4	0	0
21	6	2	6	0	0
22	141	121	0	141	141
23	103	87	0	103	74
24	65	21	0	65	61
25	116	69	0	116	115
26	45	18	0	45	22
27	31	19	0	31	6
28	97	72	0	97	67
29	56	45	0	56	55
30	105	57	0	105	97
31	21	17	0	21	0
32	81	50	0	81	59
33	54	17	0	54	25
34	136	81	0	136	73
35	32	26	0	32	18
36	41	32	0	41	20
37	51	46	0	51	37
38	53	32	0	53	38

Table 6. Number of samples collected per site suspended sediment, total suspended solids, and other selected parameters in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples				
	Total	Discharge measurement	Suspended sediment	Total suspended solids	Turbidity
39	50	44	0	50	35
40	52	48	0	52	37
41	52	43	0	52	36
42	150	111	0	150	139
43	115	76	0	115	115
44	127	99	0	127	126
45	36	18	0	36	16
46	108	75	0	108	108
47	66	46	0	66	32
48	50	42	0	50	5
49	150	143	0	150	117
50	44	44	0	44	0
51	48	48	0	48	3
52	160	145	0	160	139
53	79	77	0	79	79
54	100	96	0	100	99
55	77	65	0	77	71
56	61	26	0	61	48
57	124	108	0	124	123
58	19	6	0	19	19
59	46	26	0	46	45
60	108	96	0	108	108
61	47	45	0	47	21
62	188	110	0	188	89
63	183	87	0	183	39
64	195	103	0	195	21
65	224	108	0	224	123
66	19	13	0	19	19
67	97	61	0	97	72
68	106	53	0	106	99
69	75	55	0	75	53
70	34	18	0	34	33
71	35	33	0	35	0
72	50	45	0	50	23
73	151	149	0	151	134
74	43	41	0	43	21
75	45	41	0	45	19
76	121	119	0	121	117
77	137	108	0	137	97
78	87	55	0	87	18

Table 6. Number of samples collected per site suspended sediment, total suspended solids, and other selected parameters in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples				
	Total	Discharge measurement	Suspended sediment	Total suspended solids	Turbidity
79	90	61	0	90	18
80	79	60	0	79	70
81	31	28	0	31	31
82	26	20	0	26	26
83	170	75	0	170	163
84	91	88	0	91	43
85	51	37	0	51	51
86	119	110	0	119	79
87	19	19	0	19	19
88	8	6	0	8	8
89	18	15	0	18	18
90	18	16	0	18	18
91	51	47	0	51	47
92	85	80	0	85	84
93	42	39	0	42	38
94	118	83	0	118	114
95	35	24	0	35	30
96	157	114	0	157	147
98	123	123	0	123	123
97	96	26	0	96	25
99	123	118	0	123	120
100	24	19	0	24	23
101	125	121	0	125	121
102	193	64	0	193	109
103	75	41	0	75	75
104	142	72	0	142	138
105	79	71	0	79	78
106	61	56	0	61	9
107	122	40	0	122	97
108	128	87	0	128	115
109	128	98	0	128	115
110	95	85	0	95	88
111	113	104	0	113	98
112	95	83	0	95	89
113	81	30	0	81	57
114	97	83	0	97	90
115	160	156	0	160	138
116	88	30	0	88	88

Table 6. Number of samples collected per site suspended sediment, total suspended solids, and other selected parameters in the Great Salt Lake Basins study unit, January 1980 to December 1995—Continued

Sampling site number	Number of samples				
	Total	Discharge measurement	Suspended sediment	Total suspended solids	Turbidity
117	89	78	0	89	21
118	102	88	0	102	23
119	37	37	0	37	1
120	43	43	0	43	12
121	29	18	0	29	29
122	100	97	0	100	1
123	75	46	0	75	15
124	231	154	0	231	156
125	50	29	0	50	48
126	174	134	0	174	114
127	41	34	0	41	6
128	132	73	0	132	100
129	184	166	0	184	122
130	6	2	0	6	5
131	28	23	0	28	9
132	229	129	0	229	70
133	79	33	0	79	68
134	139	139	0	139	19
135	212	177	0	212	96
136	184	132	0	184	62
137	174	127	0	174	58
138	47	46	0	47	6
139	39	26	0	39	28
140	221	109	0	221	139
141	54	44	0	54	54
142	61	49	0	61	55
Total	11,642	8,597	640	11,002	7,939

For STORET data, there are also symbols of "<", ">", and "E" as explained above. Other symbols include: "N" = no value (for several reasons); "L" = lost sample (cannot locate); and "X" or "Q" = insufficient amount of water.

This report and the data are available for retrieval on the World Wide Web at http://ut.water.usgs.gov/.

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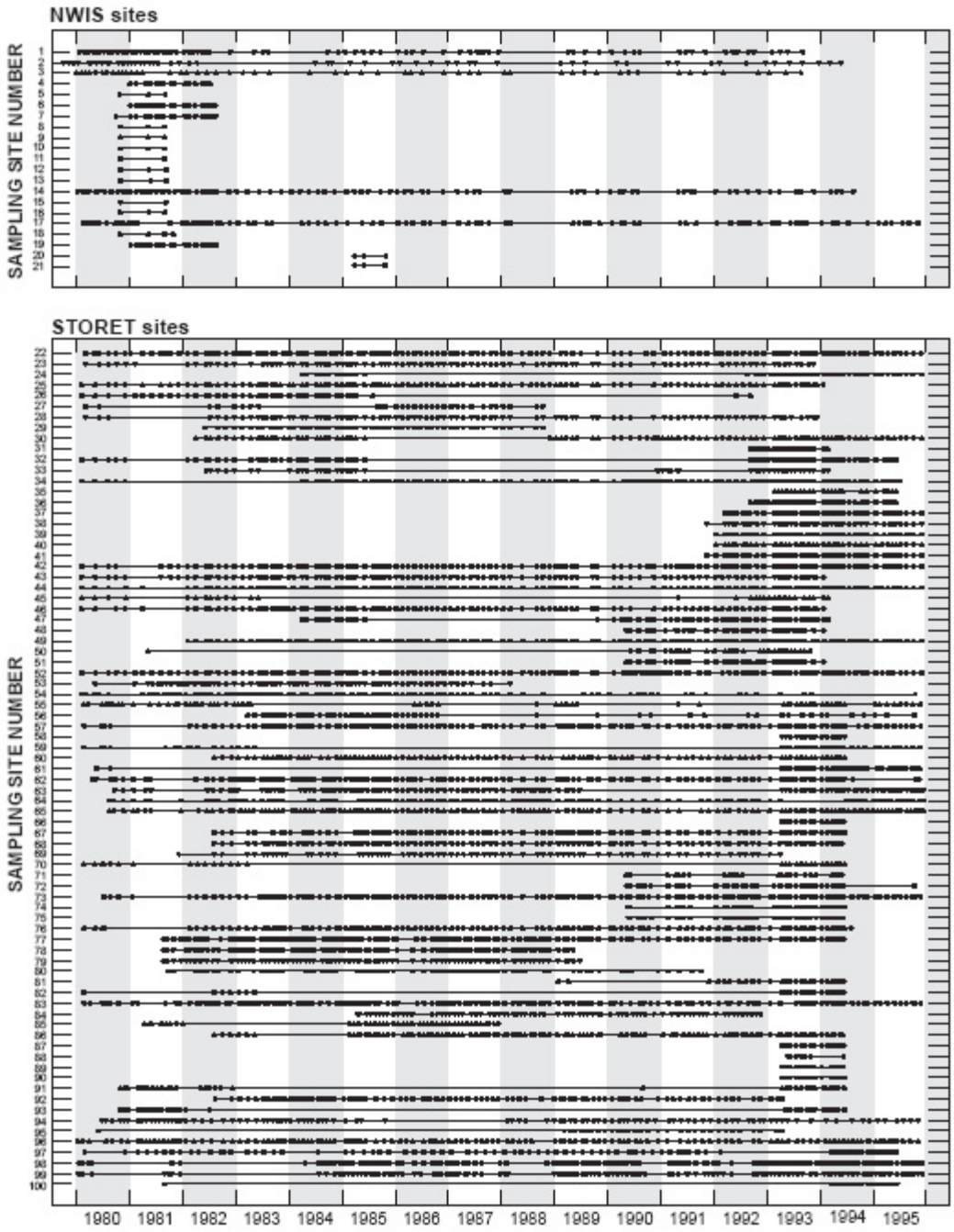

Figure 4. Distribution of sampling dates for suspended-sediment and total suspended-solids data collection, Great Salt Lake Basins study unit. (See fig. 3 and table 5 for information on sampling sites.)

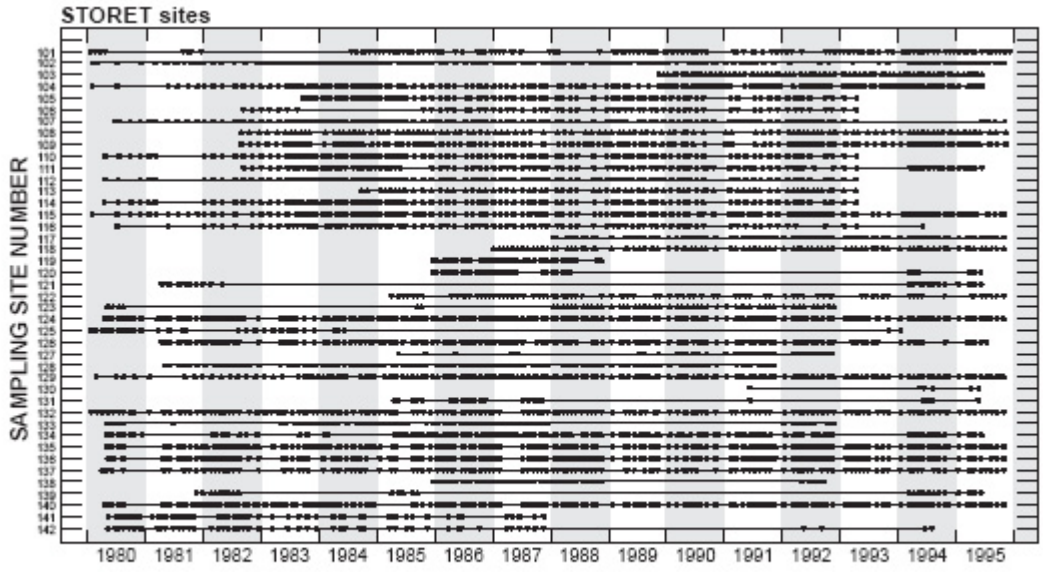

Figure 4. Distribution of sampling dates for suspended-sediment and total suspended-solids data collection, Great Salt Lake Basins study unit—Continued.

Heidi K. Hadley—Nutrient, suspended-sediment, and total suspended-solids data for surface water in the Great Salt Lake Basins study unit, Utah, Idaho, and Wyoming, 1980–95—Open-File Report 01–43

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